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# DEVELOPMENTAL TESTING

robert e. horn



center for programmed learning for business



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DEVELOPMENTAL TESTING

Trying Out Programmed Instructional Materials  
With Individual Students

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Robert E. Horn

Institute of Educational Technology  
Teachers College, Columbia University

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### The Author

Robert E. Horn is a Research Associate at the Institute of Educational Technology, Teachers College, Columbia University. He is currently concerned with the design of instructional systems, especially in the construction of information retrieval systems for the classroom and in computer-assisted instruction. Mr. Horn is a visiting lecturer at the University of Michigan's Center for Programmed Learning for Business and serves as a private consultant to industry on training matters. Mr. Horn was formerly Director of Training and Consulting Services for the Center for Programed Instruction, Inc., and before that, was Manager of Industrial Programing at Basic Systems, Inc. He has written several papers in the area of programmed instruction and is the author of a program for the high school English curriculum, Our Language, Communication and Change (tentative title), to be published by Science Research Associates in mid-1966.

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## Preface

Two and a half years ago I gave a series of beginning and advanced workshops in programmed instruction at the Center for Programed Instruction. At that time there was no useful published programmed material for training programmers. It was always a source of embarrassment to be asked "Well, if programming is so good, why don't you use it to teach programming?" The workshops provided a chance to do at least part of the job.

Among the most difficult lessons for the trainee programmer is how to be sensitive to the feedback he received from subjects during the first tryouts of a self-instructional unit. This appeared to be a challenging task to analyze and program. It proved to be especially interesting because our analysis led to the conclusion that a programmed audio component was needed to simulate some of the situations in which the trainee programmer would find himself. The last two exercises in this program require that the trainee programmer listen to a tape and critique the interaction he hears. With this experience behind him, he is then able to tape record his own interaction with test subjects and critique himself as he has practiced doing with the tape. This procedure -- if he uses it -- enables the programmer to continue to learn testing technique long after he has exhausted the resources of this program.

One satisfaction of the instructional systems designer is to have created a system which teaches better than he could do in person given the same amount of time.

Robert E. Horn  
September, 1965

## HOW TO USE THIS PROGRAM

This program of self-instruction for programmer-trainees has been designed to be used as a part of a course in programming or instructional systems design. It is assumed that the person taking the program has had some exposure to the use of programs and to the writing of sequences before he begins to use "Developmental Testing."

The program is composed of three parts:

1. The Frame Book.
2. The Panel Book.
3. An Audio-Tape recording (which can be used on any standard tape recorder).

The student should begin by using the Frame Book at page one. Instructions from time to time in this book will direct his attention to the Panel Book and to the Audio-Tape recording.

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## DEVELOPMENTAL TESTING SELF-TEST (PRE-TEST)

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This self-test is a way of establishing what you already may know about testing instructional programs. You will, thus, be able to compare what you now know with what you have learned from this program. Don't worry if you aren't able to do too well on this pre-test.

### DIRECTIONS

Prepare a checklist or outline of the important things to do and not to do in developmental testing (trying out programmed instruction with individual students).

Write the checklist as if you were making notes to explain the procedure to someone else. Be sure to include what you would do before, during, and after the tryout.

Prepare your outline on a separate sheet of paper. Do not write on this book.

At the top of each sheet, write your name and today's date.

Here are some suggested categories for your outline. You do not need to follow them exactly if you feel some other classification makes more sense for your notes.

- I. Trainee Population (Test Subjects)
  - A. Should be members of the potential student population.
  - B.
  - C.
  - etc.
- II. Room (Environment for Testing)
  - A.
  - B.
  - etc.
- III. Equipment and Supplies needed.
- IV. Instructions Prior to Test.
- V. The Program Tester's Job.

---

WHEN YOU HAVE COMPLETED YOUR CHECKLIST, PUT IT ASIDE AND TURN TO THE NEXT PAGE.

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## WHAT THIS UNIT IS ABOUT

---

There are two kinds of tests which can be performed on instructional materials before they are put into use.

1. Developmental Testing (or Student Tryouts), the purpose of which is to obtain information for revising the materials. In this kind of test, the materials are given to a few students rather than a large number. The students are carefully observed to obtain the following kinds of data:
  - . Which objectives of the training were not accomplished (as evidenced by the trainee's performance on the mastery examination)?
  - . Which items give the students undue difficulty? What were the errors the trainees made?
2. Validation Testing (or Field Performance Testing) in which the materials are considered to be ready for large scale use. A group of 15 to 30 students, representative of the total intended population, is selected. They are given the materials under the conditions in which they will eventually be used. Quantitative data on how well the materials perform is collected.

In this unit we will consider the procedures and conditions under which the most information can be obtained from Developmental Testing.

PANEL A

---

1           Two adults - employees of the client company - have been asked to act as tryout  
2 students for the first draft of a program on electronic data processing. They report to  
3 the tryout room at the proper time.

4 "Come on in," says the programmer, inviting them into the office he shares with  
5 two other members of the programming team for the computer project. "I'm Walt Burns,  
6 and this is Stan Lovett and Dave Miller, the other programmers on the project."

7           After a brief exchange of greetings, Walt invites them to sit down at a vacant  
8 eight foot table against one wall of the room. He slides up a chair and begins  
9 briefing them.

10           "What we want you to do is take this program we're writing for your company.  
11 We've been working on it for a couple of months now and want to try it out on the  
12 persons who'll actually be using it. That's where you guys come in."

13           "Now, here's the program." He hands the students copies of the program and  
14 several sharpened pencils. "If you have any questions, I'll be at my desk over there."

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CHECK YOUR EVALUATION AGAINST  
THE POINTS BELOW

Line 1. "Two adults - employees of the client company - have been asked to act as tryout students..." Good Tryout Technique. The tryout students should always be members of the intended population -- that is, the population who will eventually be learning from the materials.

Line 1. "Two adults..." The number of tryout students used at any one time will vary from one to twelve. Beginning programmers cannot handle more than one at a time. More experienced programmers can handle not more than four at once. Usually, enough information is obtained from three students to make significant revisions in the material. This is especially true if the first three students are selected carefully. One should be chosen from among the most capable end of the continuum, another from the lower ability level, and a third from those with average ability. After revisions, a second group of three can be selected and put through the tryout procedure.

Lines 5 - 6. The informal atmosphere established by the programmer is good. Everything the programmer can do to create a cooperative feeling on the part of the tryout students will help, for he wants them to give him information.

Lines 7 - 8. "...sit down at a vacant eight-foot table..." Poor technique. The students should be situated so that they cannot see how far along the others are and so that any conversation the programmer has with one will not tend to interrupt the others.

Lines 7 - 9. Tryout room is an office in which other persons are working and where distractions are likely to occur. Poor technique. The tryout room should be used for that purpose only while the tryouts are taking place.

Lines 10 - 13. Poor technique. The programmer has omitted several important items in orienting the students to the tryout situation. These are discussed in the checklist on the next page.

Line 14. "I'll be at my desk over there." It's hard to tell from the description just where the programmer's desk is. But, it is important for him to locate himself where he can observe each student's answer and behavior, without distracting him.

TURN TO THE CHECKLIST NOW. READ IT  
CAREFULLY, FOR IT IS BASIC TO AN UNDER-  
STANDING OF THE REST OF THE UNIT.

## CHECKLIST FOR THE FIRST TRYOUT SESSION

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- \_\_\_ 1. The programmer should first explain to the tryout student that the materials he is to be given are intended to help him learn subject matter designated in the title.
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- \_\_\_ 4. When the tests have been completed, the programmer should show the student the program and explain again that it is the material, not the student, that is to be tested from now on. This is an especially important point about which the student should have no question.
- \_\_\_ 5. The student should be given a ball point pen with which to write his answers. (This will prevent him from erasing potentially valuable information for revising the program.) He should be provided with answer sheets, if any.
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- \_\_\_ 10. Then ask the student to commence with the materials. (If the student asks what he should do or asks if he's doing it right, the programmer should gently insist that all the directions necessary are given in the materials. It is important to try out the directions, too.)
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- \_\_\_ 10. Then ask the student to commence with the materials. (If the student asks what he should do or asks if he's doing it right, the programmer should gently insist that all the directions necessary are given in the materials. It is important to try out the directions, too.)
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## WHEN TO INTERRUPT

---

One of the difficult decisions to make during the tryouts is whether or not to interrupt the student's train of thought in order to find out what is giving him difficulty. Examine the situations in PANEL B and the ANSWER TO YOURSELF the questions below.

---

1. Which programmer got the most information for revision, the one in Situation A or the one in Situation B?

☐ A got the most

☐ B got the most

---

2. Could the programmer in Situation B have waited until the end of the tryout session to ask about the student's difficulty?

☐ Yes

☐ No

---

3. Would the programmer have gotten as much information if he'd waited until the end of the tryout session?

☐ Yes

☐ No

---

YOU'LL FIND SOME OPINIONS ON THESE QUESTIONS ON THE NEXT PAGE.

## THE PROBLEM OF INADVERTENT TEACHING

---

The purpose of the tryout is to get information from the student for revising the program. Beginners often forget this and waste valuable opportunities to listen to what a student has to say. Their enthusiasm for teaching or for the subject matter impels them to give information to the student instead of asking for it from the student. They teach a lot inadvertently -- even in seemingly innocent situations. (Note: "Teaching" may include any kind of "running commentary" from which the student can get cues.)

---

EXAMINE THE DIALOGUE BELOW.  
ON YOUR ANSWER SHEET WRITE  
DOWN THE NUMBER(S) OF THE  
STATEMENTS WHICH EITHER DEFINITELY  
SHOW THE PROGRAMMER TEACHING OR WHICH  
SHOW THAT HE MAY BE TEACHING INADVERTENTLY.

- \_\_\_ 1. Programmer: I noticed that you raised your hand.  
Student: Yes, I can't seem to remember how to do it. Number 24.
- \_\_\_ 2. Programmer: Do you remember the answer you wrote for 22?  
Student: No...let me see.
- \_\_\_ 3. Programmer: Try reading the item again carefully.  
Student: O. K.
- \_\_\_ 4. Programmer: Think you can do it now?  
Student: Let me try it.
- \_\_\_ 5. Programmer: Good...you're doing fine...oops, careful there...ah....fine.  
Go on to the next one now.

---

ANSWER TO PREVIOUS PAGE:

Statement 1 is O.K. In Statement 2 the programmer tells the student (or at least hints) where to find part (or all) of the answer. It's definitely teaching, as are Statements 3, 4, and 5, in which the programmer first tells the student what to do and then gives a running commentary on how well he is doing. Instead, the programmer should have attempted to draw out of the student exactly what difficulty he was having.

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---

EXAMINE THE DIALOGUE ON THIS PAGE. CHECK THE STATEMENTS WHICH DEFINITELY SHOW THE PROGRAMMER TEACHING OR WHICH SHOW THAT HE MAY BE INADVERTENTLY TEACHING.

---

Student: I don't think I'm getting this.

- \_\_\_ 1. Programmer: What seems to be the matter?

Student: Well, I don't know exactly. I get this far (he points to frame 149) and then I don't know what to do next.

- \_\_\_ 2. Programmer: Let's see. You get as far as where it says "Place the decimal point and continue." on item 149.

Student: Yeh. Well, not exactly. I guess it's before that. I didn't seem to understand back here in this part.

- \_\_\_ 3. Programmer: You mean here at 101?

Student: Had trouble from there on.

- \_\_\_ 4. Programmer: Let's see if we can see what kind of trouble.

Student: Well, I think I understand in general, you know? Like I know what I'm supposed to do. But I guess I just don't know how to round off right.

- \_\_\_ 5. Programmer: You think that you need more practice in rounding off?

Student: Yes. There. Is that answer correct?

- \_\_\_ 6. Programmer: It'd help me more if you'd try to get the answer from the program, not from me.

Student: (Glances at answer.) Guess I missed it again.

- \_\_\_ 7. Programmer: Let's see. You must have thought that you were supposed to take the square root of 23 and then go on to this part.

Student: No, but I understand now. I'm gonna try the next one.

- \_\_\_ 8. Programmer: O.K. Careful with setting up the problem.



---

ANSWER TO PREVIOUS PAGE:

Statement 1 is all right. The programmer may be inadvertently teaching in Statements 2 and 8; it's hard to tell if he is being more specific about the place where the difficulty began than the student is. Statement 4 is fine. Statement 5 is a leading question. Instead of saying "You think you need more practice?" he should have said something like "What do you think would have helped you get the correct answer?" Statement 6 is excellent: part of what the programmer is testing in the tryout is how good the answers given in the program are. It is bad practice to tell the student whether or not his answer is correct. He should get that from the program. Statements 7 and 8 are both definitely teaching statements.

---

## POST-TRYOUT INTERVIEW

---

The following dialogue took place after the tryout was over. The programmer interviewed the student over special difficulties encountered in the program.

---

Programmer: I noticed that you looked puzzled at frame 199.

Student: Which one was that? I don't remember.

Programmer: This one. (He opens the program to the frame.)

Student: Oh, yeh. I remember that one. I couldn't figure that out for the longest time!

Programmer: Let's look at it. First you took this number...

Student: And then I put it...let me see ...

Programmer: Over here?

Student: Yes.

Programmer: And then didn't you divide?

Student: Uh, huh.

---

Check which of these is the best description of what went on in the dialogue above:

☐ The student told the programmer what his difficulty was and the programmer has valuable information for revision.

☐ The programmer told the student what he did and hence did not find out for sure what went wrong because the student didn't tell him. He only agreed with him.

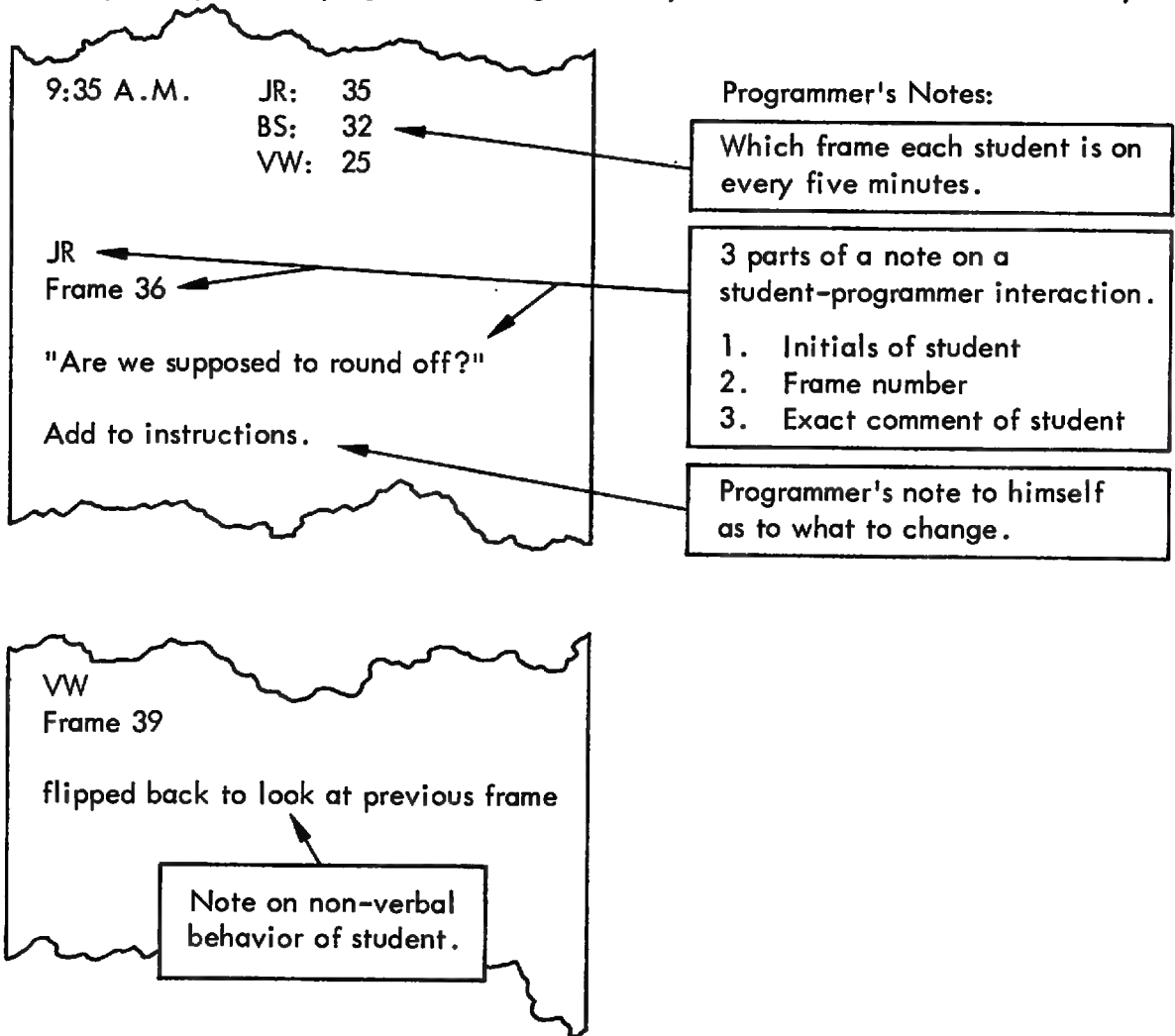
Is it just as important for the programmer to be careful of inadvertent teaching after, as well as during, the tryout?

☐ Yes

☐ No

## MAKING NOTES OF STUDENT COMMENTS

Here's an example of part of a programmer's log of the tryout session. Examine it carefully.



### Some Personal Observations by the Author

I have found that persons with a background in clinical psychology have made the best program testers. The clinical attitude of encouraging information flow from the patient to the therapist is very analogous to the tryout situation.

A useful procedure for training yourself to become sensitive to what you say during the tryout is to tape record all of your comments. Programmers with whom I've used this have found to their dismay that they teach a great deal more than they thought they did.

One program we were testing was presented to students on white 4 x 6 cards. I, as program editor, had made some rather severe remarks on pink cards of the same dimension and inserted them after the items on which the comments were made. In this particular tryout, the program got into the student's hands with the editorial comments inadvertently left in. (An inexperienced program tester who had not been told about the pink cards was doing the testing.) The student, an eighth grader, was delighted, and the amount of information he gave us was astounding. He got into the "swing of things" and was no longer bashful about telling us what was wrong with the program. To a comment of mine, "too easy," he added, "That's right." To another, "too repetitious," he wrote, "I needed the review." Now, from time to time, we use this technique to encourage student comment.

Another way of eliciting student attitude is to ask the student to comment after each item (or sequence) using a probe such as the following:

I think this item (sequence) is	
_____	too hard
_____	too easy
_____	trivial
_____	too repetitious
_____	confusing
_____	other (please explain) _____

## DEVELOPMENTAL TESTING EXERCISES

Take the tape marked "Student Tryout" and put it on your tape recorder.  
Do not start the tape yet.

---

CHECK THESE POINTS ON YOUR TAPE RECORDER:

1. The speed is set at 3-3/4 inches per second.
  2. The machine is set for playback.
- 

### EXERCISE I

In this exercise you will listen to the beginning of a student tryout. You will hear the programmer and a student talking. Your job during this exercise is to use the checklist ( pages 6-7 ) to see if the programmer does all of the things he is supposed to do. Make a note of anything he omits or any questionable practice he uses.

---

TURN ON THE TAPE RECORDER NOW

DO NOT TURN THE PAGE UNTIL THE  
TAPED PORTION OF EXERCISE I IS  
COMPLETED.



## COMMENT ON EXERCISE I

You will have found that the developmental test situation you heard in Exercise I was generally a good one. The programmer covered all of the points on the checklist.

However, there are several subtle errors committed by the programmer which might possibly cause trouble. They are:

The comment "...before we print 50,000 copies." The remark was made facetiously by the programmer, but if taken seriously by the student, it might influence his reaction to the program.

The comments "...no sense your taking the program if you do well on the pre-test" and the enthusiastic "that's good that you don't know (the material already)." These might result in a paid subject deliberately doing poorly on the pre-test in order to qualify as a student for the program.

Telling the learner the suggested average length of time to complete the program. If the student is at all sensitive about being average or above, he may hurry and thereby be something less than an ideal test subject.

## EXERCISE II

In this exercise you will again listen to a student tryout taking place. You are to do two things in the following exercise:

1. take notes on the programmer-student interaction so that you can revise the program, and
2. make note of anything the programmer on the tape does wrong during the tryout.

For this exercise, you should divide a blank sheet of paper into two columns, heading one "revision" and the second "critique." This will assist you in listening for both types of problems and in keeping your comments straight.

---

NOW, TURN TO PANEL C.

This is a copy of the program the student is taking during the tryout.

TAKE A FEW MINUTES TO FAMILIARIZE YOURSELF WITH THE PROGRAM.

---

WHEN YOU HAVE FINISHED EACH STEP ON THIS PAGE, TURN TO THE NEXT PAGE.
--



Here's a picture of the tryout taking place.

NOW START THE TAPE RECORDER.

YOU MAY STOP THE RECORDER AT ANY POINT IN ORDER TO MAKE YOUR NOTES.

DO NOT TURN THE PAGE UNTIL THE VOICE ON THE TAPE TELLS YOU TO.

STUDENT DATA SHEET

Name Edward Grupe Date January 7, 1966  
Address 5909 Grand Concourse Phone EX4-3212  
Bronx 59, N.Y.

Age 19 Date of Birth August 18, 1946 Sex M

EDUCATION: Circle last year of schooling completed.

1 2 3 4 5 6 7 8 9 10 11 (12) 13 14 15 16

TYPE OF HIGH SCHOOL COURSE: Circle.

Academic

Technical

Commercial

Other

COLLEGE MAJOR \_\_\_\_\_ DATE GRADUATED \_\_\_\_\_

COLLEGE MINOR \_\_\_\_\_

OTHER SCHOOLING (Please specify) \_\_\_\_\_

EMPLOYMENT: List your last three jobs, the companies you worked for, and the dates of your employment.

*just graduated*

WHEN YOU'VE FINISHED EXAMINING  
THE DATA SHEET, TURN ON THE RECORDER.

DO NOT TURN THE PAGE UNTIL YOU  
ARE TOLD TO DO SO BY THE TAPE.

THE LETTER BELOW IS THE PRE-TEST FOR THE PROGRAM ON BUSINESS ENGLISH.  
EXAMINE THE PRE-TEST.

PRE-TEST FOR PART I

---

Correct the following letter by crossing out the incorrect capitalization and inserting the correct.

---

JONES AND COMPANY  
195 West 34th Street, New York 94, N.Y.

January 15, 1964

Mr. <sup>B</sup> Ralph <sup>W</sup> o. weeks  
15 Beck street  
Los Angeles, California

Dear Mr. weeks:

Thank you very much for your letter of <sup>D</sup> december 29 from san francisco. After reading it I immediately checked on when the queen mary would sail. Then I walked over to penn station to see when <sup>P</sup> jane's train would arrive. I met her at the station and we walked for a while in the Winter snow. New year's day fell on a wednesday this year. The celebration here was wild. I'm sure <sup>J</sup> jane enjoyed it.

You'll let me know, I hope, when you'll be in new york next. Let's have lunch together.

Sincerely,

Alexander Jones  
Vice President

WHEN YOU'VE FINISHED EXAMINING  
THE PRE-TEST, TURN ON THE TAPE  
RECORDER AGAIN.

DO NOT TURN THE PAGE UNTIL YOU  
ARE TOLD TO DO SO BY THE TAPE.

- 1. John Glenn
- 2. Yankee Stadium
- 3. the girl
- 4. ☒ is not
- 5. I went to see Sandra.
- 6. ☒ No
- 7. ☒ Yes
- 8. ☒ Yes
- 9. ☒ B
- 10. common noun
- 11. common noun X
- 12. ☒ all of them
- 13. ☒ proper name X  
☒ common noun X
- 14. buildings are capitalized
- 15. Could you tell me where the Kings County Building is?
- 16. I went to California last year.
- 17. ☒ B
- 18. Europe  
United States

DO NOT TURN THE PAGE  
UNTIL YOU ARE TOLD TO  
DO SO BY THE TAPE.

19. Q3
20. ☒ are never
21. Los Angeles
22. + I Dugore X
23. ☒ indray
- ☒ January
- ☒ Christmas
- ☒ November
24. Thursdays April
25. Easter Sunday
26. 1. February
2. 1. March's
3. Birthday
27. ☒ near
- ☒ Friday
- ☒ month
28. Washington Street
- located to a street
29. I live at 319 Oak Street
30. ☒ A
31. ☒ summer
32. ☒ yes
33. Then Sally and I went to Boston!
- Does Martha live on Madison Avenue?



THE LETTER BELOW IS THE POST-TEST FOR THE PROGRAM ON BUSINESS ENGLISH.  
EXAMINE THE POST-TEST.

POST-TEST FOR PART I

---

Correct the following letter by crossing out the incorrect capitalization and inserting the correct.

---

JONES AND COMPANY  
195 West 34th Street, New York 94, N.Y.

January 15, 1965

<sup>R O W</sup>  
Mr. ~~r~~alph ~~o~~. ~~w~~eeks  
15 Beck <sup>S</sup>street  
Los Angeles, California

<sup>W</sup>  
Dear Mr. ~~w~~eeks:

Thank you very much for your letter of <sup>D</sup>ecember 29 from <sup>S F</sup>San Francisco.  
After reading it <sup>I</sup> immediately checked on when the <sup>Q M</sup>Queen Mary would sail.  
Then <sup>I</sup> walked over to <sup>P S</sup>Penn Station to see when <sup>J</sup>Jane's train would arrive.  
I met her at the station and we walked for a while in the <sup>W</sup>Winter snow. New  
<sup>Y</sup>Year's day fell on a <sup>W</sup>Wednesday this year. The celebration here was wild.  
I'm sure <sup>J</sup>Jane enjoyed it.

You'll let me know, I hope, when you'll be in <sup>N Y</sup>New York next. Let's  
have lunch together.

Sincerely,

Alexander Jones  
Vice President

---

LOOK OVER YOUR COMMENTS FROM THE TAPE AND ADD ANY YOU MAY HAVE  
RESERVED TO THE END OF THE TAPE. WHEN YOU'VE FINISHED, TURN TO THE  
NEXT PAGE.

---

## COMPARE THE NOTES AND COMMENTS YOU MADE WITH THE ONES BELOW

---

These are the major mistakes the programmer made:

1. The room in which the tryout takes place is not sufficiently isolated so as not to distract the student during the tryout.
2. The tape implies that the programmer gave the student a pencil rather than a ball point pen.
3. The programmer failed to repeat after the pre-test that the materials, not the student, were being tested. The student was not given sufficient orientation about each phase of the tryout, especially with regard to the purpose of his correcting the letter (which is labeled "pre-test").
4. The student was not told to put "X"s beside mistakes.
5. The student was not told to guess, when he couldn't figure out something.
6. The student was not urged to make comments or criticisms on the program.
7. No time limits for the tryout session were explained to the student.
8. The student was not told that he could take a break whenever he wanted to.
9. At one point in the course of the tryout, the programmer told the student where to look for an answer, thus inadvertently teaching him.

The following are the notes you should have made during the tryout:

FRAME NUMBER  
STUDENT'S INITIALS

Pre-test

E. G.

"not enough room to put in the big letters"

3

E. G.

"Do I turn the page?"

4

E. G.

"What am I supposed to do here?" "Put a check mark." "It isn't on my answer sheet."

11

E. G.

student looking back in book, says "trying to decide if Robert is a common or a proper."

(We didn't make a note of the student's behavior on item number 13 because the student put "X" on his answer sheet next to the question.)

14

E. G.

student got the wrong answer, but he did compare his answer to the answer sheet.

17

E. G.

student spent a long time on this one

19

E. G.

"Do I have to write whole sentences?"

21

E. G.

puzzled a long time, then asked: "I don't know what lower case means."

## POST-TEST ON DEVELOPMENTAL TESTING

---

### DIRECTIONS

Prepare a checklist or outline of the important things to do and not to do in developmental testing.

Write the checklist as if you were making notes to explain the procedure to someone else. Be sure to include what you would do before, during, and after the tryout.

Prepare your outline on separate sheets of paper.

At the top of each sheet, write your name and today's date.

## DEVELOPMENTAL TEST

### Answers to Post-Test and Self-Test

#### 1. Population

- should be members of intended (or target) population
- number of tryout students (3-12)
- should range from lowest ability level to highest in population
- no more than 3 students for one programmer during tryout sessions

#### 2. Room

- informal atmosphere
- free from distractions
- keep students separated so they cannot see what others are doing

#### 3. Equipment

- programmed unit to be tested
- answer sheets
- ball point pens
- pre-tests, prerequisites tests, and post-tests
- attitude questionnaires
- student personal information forms
- programmer's report of student tryout

#### 4. Instructions prior to program

- materials, not student, are being tested
- materials are experimental - students are helping programmer find mistakes
- need to take prerequisites test to see if he knows everything he needs to in order to take the program
- need to take pre-test to see how much he already knows

- explain that PI materials are self-instructional and that he can proceed at his own speed
- ask him to place 'x' next to answers he got wrong
- urge him to make comments for answer sheet
- ask him to guess, if he can't think of answer
- explain time limits
- tell him he can take a break when he feels like it
- explain that the rest of the directions are given in the material

5. Programmer's job

- be thoroughly acquainted with the unit being tested
- note time for beginning and end of each session and any breaks taken
- note what frame student is on every five minutes
- observe student for signs of puzzlement, boredom, fatigue and note these
- take advantage of opportunities to encourage student to comment - be careful not to discourage student
- interrupt student only when he can't proceed on his own
- if interrupting student, try to alter material on the spot
- if on-the-spot alterations fail, explore the difficulty with students using open-ended questions
- be on the alert not to inadvertently teach the student while exploring a difficulty with him
- interview the student about all difficulties at end of tryout session
- make careful notes of exact words of student, student's identity, and item number of program

IRI Copy

developmental testing  
panel book

PANEL BOOK

DEVELOPMENTAL TESTING

Trying Out Programmed Instructional Materials

With Individual Students

Robert E. Horn

Copyright 1964, Robert E. Horn



PANEL C

CONTEMPORARY BUSINESS ENGLISH

Part I

Using Capital Letters Correctly

PRETEST FOR PART I

---

CORRECT THE FOLLOWING LETTER BY CROSSING OUT THE INCORRECT CAPITALIZATION AND INSERTING THE CORRECT.

---

JONES AND COMPANY  
195 West 34th Street, New York 94, N. Y.

January 15, 1965

Mr. ralph o. weeks  
15 Beck street  
Los Angeles, California

Dear Mr. weeks:

Thank you very much for your letter of december 29 from san francisco. After reading it i immediately checked on when the queen mary would sail. Then i walked over to penn station to see when jane's train would arrive. I met her at the station and we walked for a while in the Winter snow. New year's day fell on a wednesday this year. The celebration here was wild. I'm sure jane enjoyed it.

You'll let me know, I hope, when you'll be in new york next. Let's have lunch together.

Sincerely,

Alexander Jones  
Vice President

1.

Proper names are the names of particular people, places, or things.

- A. the spaceman
- B. John Glenn

Which of these words names a particular person?

\_\_\_\_\_

John Glenn

2.

- A. the ball park
- B. Yankee Stadium

Which of these names a particular place?

\_\_\_\_\_

Yankee Stadium

3.

Proper names are the names of particular people, places, or things.

- A. the girl
- B. Jane

Which of these is not a proper name? \_\_\_\_\_

the girl

4.

"Chicago" ( \_\_\_ is \_\_\_ is not) a proper name.

\_\_\_ is

5.

The first letter of a proper name should always be a capital letter.

I went to see sandra.

Copy the sentence below and capitalize the proper name in it.

I went to see  
Sandra.

6.

EXAMPLE: Who is your girl friend?

Is there a proper name in this example?

\_\_\_ Yes

\_\_\_ No

\_\_\_ No

7.

- A. Who is your girl friend?  
B. Her name is Sandra Nelson

Both of these sentences are properly capitalized.

Is there a proper name in sentence B? ☐ Yes  
☐ No

There are \_\_\_\_\_ (how many?) words in the girl's name.

Is the first letter of each word in her name capitalized? ☐ Yes  
☐ No

☐ Yes

two

☐ Yes

8.

EXAMPLE: His name is robert frederick doe.

Copy the example below. (Be sure to capitalize it correctly.)

His name is  
Robert Frederick Doe.

9.

- A. I'm from New york.  
B. I'm from New York.

Which sentence is correct? ☐ A  
☐ B

☐ B

10.

Nouns which are not proper names are called common nouns.

EXAMPLE: I saw the man.

The word "man" in the example is a c \_\_\_\_\_ n \_\_\_\_\_

common noun

11.

EXAMPLE: I saw Robert.

In this sentence, Robert is a ( \_\_\_\_\_ common noun  
\_\_\_\_\_ proper name).

\_\_\_\_\_ proper name

12.

- A. alice
- B. new york
- C. ralph

Which of these words should be capitalized?

- \_\_\_\_\_ none of them
- \_\_\_\_\_ only A
- \_\_\_\_\_ only B
- \_\_\_\_\_ only C
- \_\_\_\_\_ both A and C
- \_\_\_\_\_ all of them

\_\_\_\_\_ all of them

13.

A. What ship are you sailing on?

B. I'm going on the Independence.

The word ship in sentence A is a (\_\_\_ common noun  
\_\_\_ proper name.)

The word Independence in sentence B is a  
(\_\_\_ common noun \_\_\_ proper name).

\_\_\_ common noun

\_\_\_ proper name

14.

A. What is that building?

B. It's the Empire State Building.

Both sentences are properly capitalized.

What is a general rule that you can give about the  
capitalization in sentence B?

.....

Each word of a  
proper name is  
capitalized.  
(or equivalent  
response)

15.

EXAMPLE: Could you tell me where the  
kings county building is?

Copy the example below and capitalize each letter  
of the proper name.

Could you tell me  
where the Kings  
County Building is?

16.

A. I went to california last year.

B. I've lived in thirteen states.

Copy the sentence containing the proper name below and capitalize the proper name.

I went to California  
last year.

17.

A. collins college

B. the university

Which example above is a common noun?

\_\_\_\_\_ A

\_\_\_\_\_ B

\_\_\_\_\_ B

18.

JIM: Have you ever been to europe?

BILL: No. I've lived in the united states  
all my life.

Copy only the proper names below. Be sure to  
capitalize them.

Europe  
United States



19.

The word "I" is always capitalized. Which of the following sentences is correct?

- A. Then i went to the movies.
- B. After that I went home.

B

20.

Common nouns ( \_\_\_\_ are always \_\_\_\_ are never) capitalized.

\_\_\_\_ are never

21.

EXAMPLE: Do you think <sup>I</sup>y/should go?

There are two words in the sentence below which need capitals. Cross out the lower case letters and place capital letters above them where capital letters are necessary.

I think you should go to los angeles.

L A  
...~~l~~os ~~a~~ngeles...

22.

In the example below, cross out the lower case letters and write capital letters above them where necessary.

First i went to the drugstore.

First <sup>I</sup>/~~i~~ went...

23.

Days of the week, months of the year, and the names of holidays are capitalized. Check which of the following should be capitalized.

_____ monday	_____ months
_____ january	_____ november
_____ days	_____ birthday
_____ christmas	_____ holiday

_____ monday
_____ january
_____ christmas
_____ november

24.

A. When were you born?

B. I was born on thursday, april 19, 1940.

There are two words in sentence B which do not have capital letters and should have them. Cross out the letters and write the correct capital letter above them.

.. <sup>T</sup>/~~t~~hursday, <sup>A</sup>/~~a~~pril

25.

- A. What day does easter come on this year?  
B. It comes on sunday every year, stupid.

Cross out the mistake(s) and write the correct capital letter above the word.

E  
...~~e~~aster...  
S  
...~~s~~unday...

26.

- A. How many holidays are there in february?  
B. Two. We get off from school on Washington's Birthday and lincoln's birthday.

Which three words in these two sentences should be capitalized? Write them correctly below:

1. \_\_\_\_\_  
2. \_\_\_\_\_  
3. \_\_\_\_\_

1. February  
2. Lincoln's  
3. Birthday

27.

Place a check mark beside each of the common nouns.

- |                |                         |
|----------------|-------------------------|
| ___ A. man     | ___ D. thanksgiving day |
| ___ B. florida | ___ E. month            |
| ___ C. holiday | ___ F. july             |

- |             |             |
|-------------|-------------|
| <u>✓</u> A. | ___ D.      |
| ___ B.      | <u>✓</u> E. |
| <u>✓</u> C. | ___ F.      |

28.

- A. washington street
- B. the street
- C. a beautiful street

One of these examples needs two capital letters.

Write it correctly below.

.....

Why does it need capital letters?

.....

Washington Street

It needs capital letters because it is the name of a particular place.

29.

EXAMPLE: I live at 319 oak street.

Copy this sentence below and put in the correct capital letters.

.....

I live at 319  
Oak Street.

30.

- A. summer
- B. July

Which of these words is the name of a season of the year?

\_\_\_ A  
\_\_\_ B

\_\_\_ A

31.

The names of the seasons are not capitalized.

June, July, and August are the ( \_\_\_ summer  
\_\_\_ Summer) months.

\_\_\_ summer

32.

EXAMPLE: Fall is another name for autumn.

Is this sentence correctly capitalized?

\_\_\_ Yes

\_\_\_ No

\_\_\_ Yes

33.

Now, here's a review of some of the things you've learned about capitalization. Correct the sentences below:

A. then sally and i went to boston.

B. does martha live on madison avenue?

Then Sally and I  
went to Boston.

Does Martha live  
on Madison Avenue?

# DEVELOPMENTAL TESTING

a self-instructional program by  
Robert E. Horn\*

Here is an excerpt from a hypothetical individual testing session from the "Developmental Testing" program. The student is having difficulty with an item.

Programmer: Let's see. You must have thought that you were supposed to take the square root of 23 and then go on to this part.

Student: No, but I understand now. I'm gonna try the next one.

Programmer: O.K. Careful with setting up the problem.

This programmer has made two errors:

1. in his first statement, he speculates on the problem rather than asking the student what was causing the difficulty, and
2. in his second statement, he is inadvertently teaching, which will prevent the testing session from being a reliable measurement of how well the program can teach.

When the program is group tested, students will probably make a number of errors. As often happens, the programmer may decide that individual testing is not useful. But it is his incomplete knowledge of how to individually test that keeps him from obtaining useful information for revision.

CONTENT: The "Developmental Testing" program teaches:

- ...establishing a suitable environment for the testing session,
- ...what instructions to give to the test subject,
- ...when and how to intervene in the testing process,
- ...encouraging useful comments from the student,
- ...avoiding inadvertent teaching, and
- ...taking notes on student comments and behavior.

FORMAT: The program package includes the program book, a tape recording of good and bad individual testing sessions, and a panel book showing the program being tested on the recording.

COST: The prices listed below include the program book, the panel book, and the tape.  
1 - 6 — \$8.95 each  
7 or more — \$6.95 each

\*Mr. Horn is a Research Associate at the Institute of Educational Technology, Teachers College, Columbia University.

Detach and send to the Center for Programmed Learning for Business, 340 South State Street, Bureau of Industrial Relations, The University of Michigan, Ann Arbor, Michigan

Please send \_\_\_ copies of "Developmental Testing" to:

Name \_\_\_\_\_  
Title \_\_\_\_\_  
Organization \_\_\_\_\_  
Street \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_  
\_\_\_ Check enclosed \_\_\_ Bill my company

## DESCRIPTION OF

### A SELF-INSTRUCTIONAL PROGRAM FOR TRAINING PROGRAMERS IN

#### DEVELOPMENTAL TESTING (STUDENT TRYOUTS)

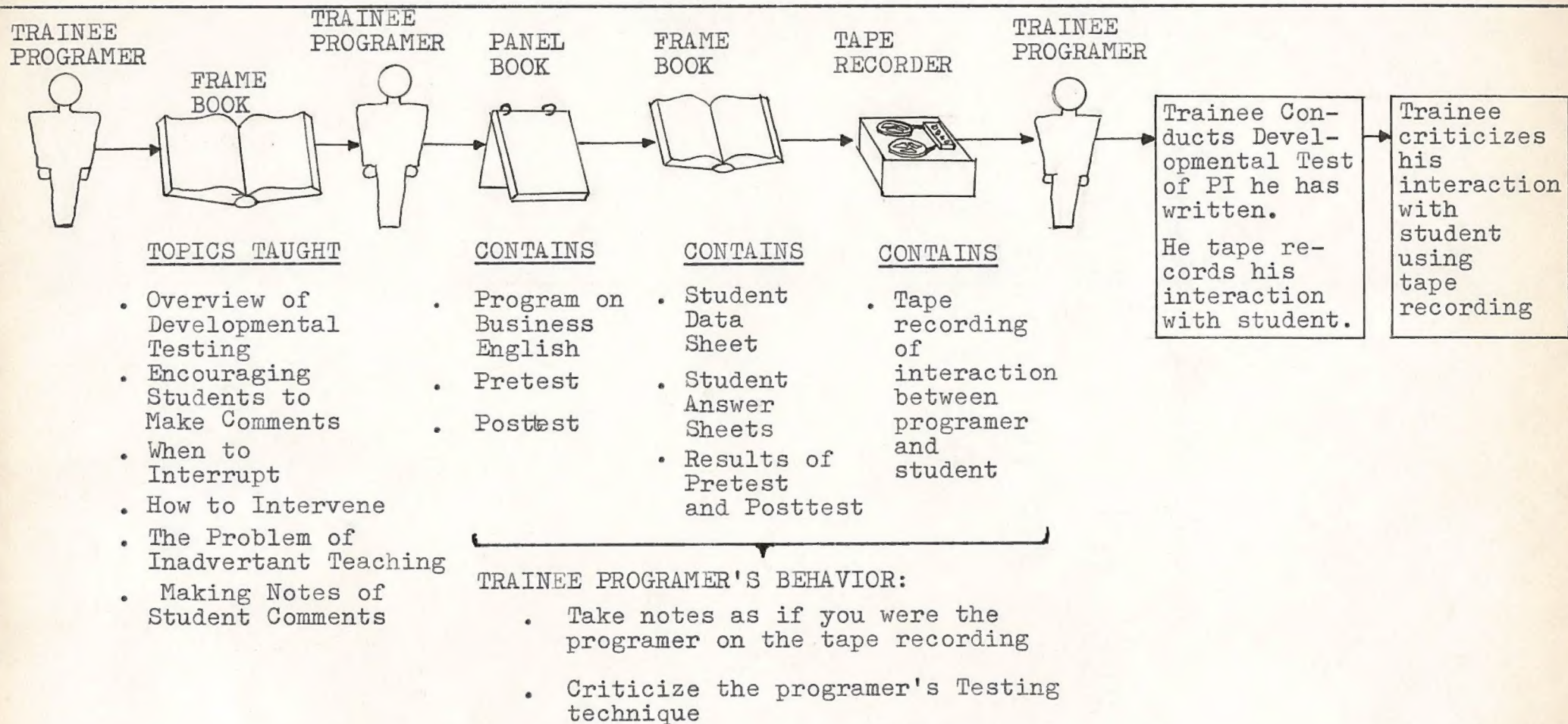
The accompanying chart shows the teaching strategy for a self-instructional program for training programmers in developmental testing (or student tryouts).

- . In the first phase the trainee programmer is taught certain aspects of how to conduct a developmental test or student tryout of a programed instructional sequence; major emphasis is placed on the programer-student interaction.
- . In the second phase the trainee programmer listens to the programer-student interaction on a tape recorder. He has in front of him at various points in the listening process the program which the student is taking, the pre- and posttests, the student's personal data sheet, and the student's answer sheets.
- . The trainee programmer's job in this second phase is to:
  - . Take notes as if he were the programmer in the developmental test situation on the tape recorder.
  - . Criticize the programmer's testing technique.
- . In the third phase the trainee programmer conducts a developmental test of a program he has written with a student. He records his interaction with the student.
- . In the fourth phase he criticizes his own interaction with the student, thus providing himself with feedback on his testing technique.

This program has been in operational use for the past year and a half in various versions. It was developed in the author's beginning and advanced workshops in programed instruction while he was Director of Training and Consulting Services for the Center for Programed Instruction, Inc. It has also been used by a company whose major product is programed instruction for training its programmers.



# SELF-INSTRUCTIONAL PROGRAM FOR TRAINING PROGRAMERS IN DEVELOPMENTAL TESTING (STUDENT TRYOUTS)





# new programs

**"Developmental Testing,"** by Robert E. Horn. Published and distributed by The Center For Programmed Learning For Business, The University of Michigan, Ann Arbor, Mich. 1964. 35 pp. 8½ x 11 in., soft cover. Panel book, 12 pp. Tape recording, 15 min., 3¾ ips. \$8.95; quantity discount.

"Developmental Testing" is for the beginning writer of programed instruction. The author of the program, Robert E. Horn, comes well qualified for his task. He was formerly Director of Training and Consulting Services for The Center For Programed Instruction. The program grew out of his practical experience from directing workshops in programed instruction at the Institute of Educational Technology, Teachers College, Columbia University.

## Getting feedback is difficult

He found that one of the most difficult lessons for the beginning program writer is how to be sensitive to the feedback he gets from subjects during early tryouts of a program. So, he analyzed the task and programed it.

By "developmental testing," the author means individual learner tryout during the writing process to get qualitative information for revising the program. This has nothing to do with validation testing, the field-performance tryout of the program by groups to confirm that it meets its stated objectives.

The program is attractively packaged. It consists of three simple parts:

- (1) Workbook with exercises.
- (2) Tape recording of simulated testing sessions.
- (3) Panel book showing the lesson being tested on the tape.

Key topics of the program stress to:

- (1) Set up a suitable test environment.
- (2) Give instructions to the test trainee.

- (3) Intervene in the testing process.
- (4) Encourage useful comments.
- (5) Avoid inadvertent teaching.
- (6) Take notes on learner comments and behavior.

"Developmental Testing" is an action project designed for self-teaching. It assumes that the learner is acquainted with the use of programs and that he has already been introduced to the writing of programed instruction.

To get an idea of what the program is all about, you might like to try and answer some questions from the pretest. On a separate sheet, prepare a simple outline, as if you explained the job to someone else, of the important things *to do* and *not to do* in individual tryout. Use common sense:

- (1) How many tryout trainees? (Subjects) What kind? What should be their characteristics? How many at one session?
- (2) How do you arrange your tryout room? (Environment)
- (3) What tryout materials will you use?
- (4) How do you brief the tryout trainee? On P.I.? On the test program? On his testing job?
- (5) What else must you do, as a program writer, before, during and after tryout? What do you prepare, observe, record?

For suggested answers, see end of this review.

## How to use the program

Here's how you use the program: First, you study typical episodes during tryout and follow the dialog between programmer and trainee. Then, you practice how to differentiate between correct and incorrect methods. You make notes about mistakes and omissions and point out techniques which could be improved.

Finally, you listen to the audio tape on a standard tape recorder. You hear typical tryout sessions and follow the interchange between programmer and trainee. With the help of the panel book, you critique the interaction and make notes to suggest corrections in the test program.

To sample the flavor of the tape, let's take two typical excerpts. The first is an example of poor technique, the second is a recommended approach.

- (1) TRAINEE: "I'm having difficulty.

PROGRAMER: "Which one?"

T: "Number seventy-five.

P: "Oh, seventy-five! The two guys last week had trouble with that one too. You didn't understand what 'parameter' meant.

T: "Well, I'm not positive that I know.

P: "It means a 'limit'—as the limit of a problem or a job."

(2) TRAINEE: "I'm confused.

PROGRAMER: "On which frame?"

T: "Both of these—one twenty-four and five.

P: "Let's see.

T: "I got the first, but not the second.

P: "Hmmm. I think I know what may be giving you trouble. Suppose I change this sentence this way. Does that make any difference?"

T: "Yes. It's perfectly clear now.

P: "I'll just write those new words right in the frame. It'll help the next person who does the program."

The tape recording has some technical flaws: unintended repetitions, some sound overlap and echo effects. The voices do not sound professional. However, the episodes do come across and simulation is well done.

Instructions on the tape are clear and apparently well tested, a point often overlooked by busy programmers. Sound signals serve to alert you to action. Pacing is reasonable. You are invited to make notes while listening, stop the tape whenever you like, rewind to listen over again. How long does it take? About 45 minutes for the complete course. That includes 15 minutes of tape recording.

## Used at Michigan workshop

The program is being used in the workshop for beginning programmers at the University of Michigan to supplement training in developmental testing. Immediately following the program, learners conduct tryout interviews to practice their newly gained skill.

Through observation, the workshop staff found that the program teaches these important skills:

- (1) How to sift out relevant trainee feedback.
- (2) When to shut up and listen.
- (3) How to avoid overlistening to trainee criticism. ("You don't like it? All right, I'll change it.")

(continued on page 42)



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With this system, the trainee works at his own speed . . . stops at a question or a diagram . . . reverses to review a motion sequence of a field problem . . . moves ahead to learn more. This stop-and-go learning experience . . . which uses sound, motion, and study pauses . . . improves subject retention and increases learning speed 25 percent over other programmed systems.

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## NEW PROGRAMS

(continued from page 39)

(4) How to avoid teaching the tryout trainee. ("You don't get it? Let me tell you . . .")

Most learners at the Michigan workshop react favorably to the program. They like the simulated sessions between tryout trainee and programmer. It gives them a feel for the tryout sessions. It makes them not only more receptive, but also more selective when listening to trainee comments.

### Shortcoming

Perhaps the major weakness of this program is that it does not give the learner a definite statement of training objectives. As a result, the posttest merely asks the beginning programmer to develop a checklist of the do's and don'ts of developmental testing. In effect, it is the same as the pretest, a pencil-and-paper measure which serves merely to verbalize the job. Clearly, this is not an effective test of the skills the learner practiced in the program's exercises. Why have him write about the job? He is supposed to do it. Obviously, if we just supply our budding programmer with a good checklist, he will have little need for developing his own, every time he does developmental testing.

Instead, the posttest should focus on the desired skills: How to set up the tryout session, how to give instructions, how to intervene, how to listen, how to avoid teaching and how to make notes. By writing out definite training objectives in terms of observable skills, a more meaningful posttest could be developed. For example, a role-play test can be designed to measure training outcomes.

To summarize, "Developmental Testing" shows on the minus side:

- (1) No stated training objectives.
- (2) Posttest not relevant to desired training outcomes.
- (3) Nonprofessional recording with some technical flaws.

It scores on the plus side with:

- (1) Challenging exercises and busy action projects.
- (2) Good simulation of tryout sessions.
- (3) Building and developing useful skills.

What if the beginning programmer does develop sensitivity to student feedback? What is he going to do with those critical comments? How does he revise his manuscript? That will be the subject of future programmed exercises. "Developmental Testing," the author explains, is only the first unit of a larger program now under development.

It would be exciting to see the author in future program units achieve even greater job simulation, create more relevant posttests and design stronger follow-up exercises by exploring the opportunities of video tape.

No validation data is as yet available from the publisher. Hopefully, such data will be published when the entire program has been completed. But why hesitate to try a program because it offers no validation data? Consider this: reading a review or studying validation data can only help you preselect a program. Your final evaluation of any program must come from testing it on your own trainees. So, if you or your staff want to sharpen your skills in developmental testing, why not try Robert Horn's "Developmental Testing" program?

### Suggested answers for self-test

(1) Use 3 to 12 tryout trainees; no more than 3 per session. Use members of intended audience, representing entire ability range.

(2) Keep room informal, free from distractions; trainees separated.

(3) Have ready: lessons, panels exercise materials, pencils, answer sheets, tests, opinionaires, trainee data sheet. Also, specified study aids: dictionary, slide rule, microscope, etc.

(4) P.I. is self-instructional, self-pacing. Experimental material, not trainee, is being tested. Take pretest. Help find mistakes as co-editor. Make comments. Find all other directions in the lesson.

(5) Know lesson thoroughly. Keep time record. Observe trainee, check his progress regularly; note fatigue, boredom, puzzlement. Interrupt only when he is stuck and try to correct material on the spot. Encourage frank comments. Explore difficulties with open-ended questions. Avoid teaching. Avoid over-listening to criticism. Keep trainee records.—RALPH A. DREKMAN